What is claimed is:

1. An apparatus for autonomous operation over an area comprising:

a drive system; and

a controller in communication with said drive system, said controller including a processor programmed to:

provide at least one scanning pattern for a first portion of said area;

analyze said first portion for an opening to a second portion of said area; and

signal said drive system to move along a path at least proximate the periphery of said first portion to and through said opening to said second portion of said area.

2. The apparatus of claim 1, wherein said processor is additionally programmed to provide at least one scanning pattern for said second portion of said area.

4 ~~3~~. The apparatus of claim 1, wherein said processor is additionally programmed to indicate the end of said at least one scanning pattern for said first portion of said area when lateral advancement of said apparatus in accordance with said at least one scanning pattern is no longer possible.

5 ~~4~~. The apparatus of claim 1, wherein said at least one scanning pattern provided is substantially free of repetition.

3 ~~5~~. The apparatus of claim 2, wherein said at least one scanning pattern provided is substantially free of repetition.

6. The apparatus of claim 1, wherein said movement at least proximate to said periphery of said first portion includes a contour movement.

7. An apparatus for autonomous operation over an area comprising:

a drive system; and

a controller in communication with said drive system, said controller including a processor programmed to:

provide at least one scanning pattern for a portion of said area from a first point;

signal said drive system to move along a path at least proximate the periphery of the scanned portion to a second point, said second point at a different location than said first point; and

provide at least one scanning pattern for a portion of said area from said second point.

8. The apparatus of claim 7, wherein said processor is programmed such that said path includes a predetermined length.

9. The apparatus of claim 7, wherein said processor is additionally programmed to dynamically determine the length of said path.

10. The apparatus of claim 9, wherein said length of said path (D) determined dynamically is in accordance with the formula:

$$D = [K_1 \bullet d]\,[\Sigma L_i / \max\{L_i\}] + [K_2 \bullet \max\{L_i\}]$$

where,

L_i is the series L_1 to L_n, and L_1 to L_n are the lengths of each straight line portion of the scanned pattern;

K_1 and K_2 can be, for example, $K_1 = 0.8$, $K_2 = 1$, where L_i are measured in meters; and

d is the diameter of the apparatus, for example apparatus 20, expressed in meters.

11. A nozzle for suction of particulates comprising:

a body, said body including a first end and a second end, said first end including a neck, and said second end including an upper edge and a lower edge defining an opening therebetween;

a lip extending at least substantially parallel to said opening along said upper edge and extending at least partially beyond said lower edge of said opening, said lip tapering upward from a portion of greater thickness to portions of lesser thickness, said lip configured for creating a flow cavity to be formed with the floor or surface over which said nozzle traverses.

12. The nozzle of claim 11, wherein said lip is rounded in cross sectional shape.

13. The nozzle of claim 11, wherein said lip and said opening define a constant vertical aperture.

14. The nozzle of claim 11, wherein said upper edge is along a first plane and said lower edge is along a second plane, said first and second planes at least substantially parallel with respect to each other.

15. The nozzle of claim 11, wherein said body includes outwardly tapered sides, said outward tapering extending from said neck.

16. A method for area coverage by an autonomous machine comprising:

scanning a first portion of said area in accordance with at least one scanning pattern;

analyzing said first portion for an opening to a second portion of said area; and

moving along a path at least proximate to the periphery of said first portion to and through said opening to said second portion of said area.

17. The method of claim 16, additionally comprising: scanning said second portion in accordance with at least one scanning pattern.

19 ~~18~~. The method of claim 16, additionally comprising: indicating the end of said at least one scanning pattern for said first portion of said area when lateral

advancement of said apparatus in accordance with said at least one scanning pattern is no longer possible.

20 ~~19~~. The method of claim 16, wherein said at least one scanning pattern is executed substantially free of repetition.

18 ~~20~~. The method of claim 17, wherein said at least one scanning pattern is executed substantially free of repetition.

21. The method of claim 16, wherein said movement at least proximate to said periphery of said first portion includes a contour movement.

22. A method for area coverage by an autonomous machine comprising:

scanning a portion of said area in accordance with at least one scanning pattern, from a first point;

moving along a path at least proximate the periphery of said scanned portion to a second point, said second point at a different location than said first point; and

scanning a portion of said area in accordance with at least one scanning pattern, from said second point.

23. The method of claim 22, wherein said moving along said path includes moving a predetermined length.

24. The method of claim 22, wherein said moving along said path includes determining the length of said path dynamically.

25. The method of claim 22, wherein said determining the length of said path (D) dynamically is in accordance with the formula:

$$D = [K_1 \bullet d] [\Sigma L_i / \max \{ L_i \}] + [K_2 \bullet \max \{ L_i \}]$$

where,

L_i is the series L_1 to L_n, and L_1 to L_n are the lengths of each straight line portion of the scanned pattern;

K_1 and K_2 can be, for example, $K_1 = 0.8$, $K_2 = 1$, where L_i are measured in meters; and

d is the diameter of the apparatus, for example apparatus 20, expressed in meters.

26. An obstacle detection system for an autonomous cleaning machine comprising:

a control system;

a nozzle, said nozzle including a first end for receiving particulate inflow, and a second end for communicating with a suction generating unit, said second end including arms;

a height adjustment system coupled to said first end of said nozzle, said height adjustment system in communication with said control system; and

receiver portions configured for receiving said arms in a pivotal engagement, at least one of said arms and said respective receiver portions and said arms including first electrically conducting portions in electronic communication with said control system; and

at least one of said arms mounted in said respective receiver portion so as to define an open circuit when said at least one arm is at a first position in said respective receiver portion, and defining a closed circuit when said at least one arm is at a second position, where said first electrically conducting portions are in contact with each other.

27. The apparatus of claim 26, additionally comprising a biasing member in communication with said at least one arm and said respective receiver portion for maintaining said first position.

28. The apparatus of claim 27, wherein said biasing member includes a spring.

29. The apparatus of claim 27, additionally comprising:

second electrically conducting portions on at least one arm and said respective receiver portion, said electrically conducting portions in communication with said control system; and

said at least one arm mounted in said respective receiver portion so as to define a closed circuit when said arm is at said first position in said respective receiver portion, and defining an open circuit when said at least one arm is at said second position, where said second electrically conducting portions are out of contact with each other.

30. The apparatus of claim 29, wherein said control system is configured to signal said height adjustment upon the detection of either of said closed circuit between said first electrically conducting members or said open circuit between said second electrically conductive members.

31. An obstacle detection system for an autonomous cleaning machine comprising:

a control system;

a nozzle, said nozzle including a first end for receiving particulate inflow, and a second end for communicating with a suction generating unit, said second end including arms;

a height adjustment system coupled to said first end of said nozzle, said height adjustment system in communication with said control system; and

receiver portions configured for receiving said arms in a pivotal engagement, at least one of said arms and said respective receiver portions and said arms including first electrically conducting portions in electronic communication with said control system; and

at least one of said arms mounted in said respective receiver portion so as to define a closed circuit when said arm is at a first position in said respective receiver portion, and defining an open circuit when said at least one arm is at a second position, where said first electrically conducting portions are out of contact with each other.

32. The apparatus of claim 31, additionally comprising a biasing member in communication with said at least one arm and said respective receiver portion for maintaining said first position.

33. The apparatus of claim 32, wherein said biasing member includes a spring.

34. The apparatus of claim 32, additionally comprising:

second electrically conducting portions on at least one arm and said respective receiver portion, said electrically conducting portions in communication with said control system; and

said at least one arm mounted in said respective receiver portion so as to define an open circuit when said arm is at said first position in said respective receiver portion, and defining a closed circuit when said arm is at said second position, where said second electrically conducting portions are in contact with each other.

35. The apparatus of claim 34, wherein said control system is configured to signal said height adjustment upon the detection of either of said open circuit between said first electrically conducting members or said closed circuit between said second electrically conductive members.

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